Notes on Tromatobia rufopectus (Cress.), a recent Immigrant in Hawaii (Hymenoptera)

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This parasite in the egg cocoons of *Argiope avara* was first discovered in Hawaii by Mr. J. S. Rosa, at the Kailua substation of the Hawaiian Sugar Planters' Association, June 14, 1932, where they were issuing from an egg cocoon. The next collection of the parasite was by the writer at Kumuwela, Kauai, June 25, 1932, when a spider egg cocoon was found on a Dianella leaf, which contained 10 parasite pupae, from which the adults matured June 30. Later collections were as follows: Sept. 11, Gunsight Pass, Waianae Mts., one specimen collected; Sept. 27, Makua Valley, Oahu, an egg cocoon of *Argiope avara* collected, from which 11 parasites issued on Oct. 10; Oct. 9, an Argiope cocoon collected by Dr. F. X. Williams at Pauoa Flats, contained 8 eggs of the parasite; Nov. 7, one egg cocoon with 8 to 10 parasite eggs, collected in an abandoned pineapple field at Kunia, Oahu; Nov. 16, 8 Argiope egg cocoons were found at Kalauoa, Oahu, near together among twigs of an *Acacia confusa* tree, from all of which parasites had issued. In November, also, Dr. Williams collected spider cocoons (Pagiopalus) from cane leaves at Honokaa, Hawaii, from which three of the parasites issued early in December. Nearly every cocoon had had parasites, only one parasite in each of 6 spider egg cocoons.

Thus this parasite is known to occur on Oahu, Kauai and Hawaii, and seems to be quite effective in reducing its chief host, for *Argiope avara* is not nearly as common at present as formerly. At least three species of spiders are known as hosts. Besides Argiope and Pagiopalus, mentioned above, the egg cocoon from which parasites were reared on Kauai was of a different species, but its identity not known. In California, from whence it undoubtedly came, Tromatobia larvae are said to feed on the eggs of *Argiope argentata* and other spiders of the family Epeiridae.

In such large egg cocoons as those of *Argiope avara,* not all of the eggs are eaten by the parasite larvae. In one instance, 360 spiders hatched from eggs left uneaten by 11 parasite larvae in a single cocoon. Counts were made of the eggs in a few of these cocoons, giving 467, 750, 948, respectively. Eight to eleven parasite eggs have been found in single egg cocoons. The eggs are deposited in the loose silk of the inner part of the cocoon, near together but not in contact, and not in contact with the spider eggs. The egg is white, cylindrical, rounded at one end, pointed at the other, 1 mm. long. On hatching the larvae pass to the interior of the mass of eggs, feeding for about 3 or 4 days, when they become 6-7 mm. long, plump and yellow. Cocoons are spun, more or less attached, and the adults mature and issue in about 8 to 10 days, or 11 to 14 days from the hatching of the eggs.

In several instances larvae were isolated in separate vials and given 50 eggs apiece to determine how many eggs are required for their growth. The number eaten was a little less than 50, a few being left—42 to 45 were eaten, respectively. Allowing for 50 eggs per parasite larva, the number of eggs consumed in an Argiope egg cocoon with the maximum number of parasites (11) would be 550. As the number of eggs per cocoon is often much in excess of this, there should be a large number of eggs left for hatching. It would seem that the parasite would not have much effect in reducing this particular one of its hosts, and yet it is already noticeably less prevalent than formerly.